

## *Rotundabaloghia korsosi* sp. nov. (Acari: Uropodina) from Taiwan

Jenő Kentschán\*

Systematic Zoology Research Group, Hungarian Academy of Sciences, Department of Zoology, Hungarian Natural History Museum, H-1088 Budapest, Baross u. 13, Hungary

(Received August 6, 2008; Accepted November 17, 2008)

**Abstract.** The first record of the genus *Rotundabaloghia* Hirschmann, 1975 in Taiwan consists of a new species (*R. korsosi* sp. nov.) which is described herein. Original drawings, microscopic photographs, and a key to the relative species are given accompanied by taxonomic and zoogeographical notes.

**Keywords:** Acari, Uropodina, *Rotundabaloghia*, new species, Taiwan.

### INTRODUCTION

Uropodina mites of Taiwan are poorly investigated. Only the following species are known from the island: *Metagynella moserisimilis* Hiramatsu, 1981; *Ruehmnerteria malayica* (Vitzthum, 1921); *Trigonuropoda sanguineasimilis* Hirschmann & Hiramatsu, 1990; *Trichouropoda austroasiatica* (Vitzthum, 1921); and *Uroobovella nantouensis* Hiramatsu & Hirschmann, 1992 (Wiśniewski, 1993).

The genus *Rotundabaloghia* Hirschmann, 1975 is one of the most species-rich Uropodina genera in tropical and subtropical regions (Wiśniewski, 1993). Species of this genus occur in tropical soils, moss, and leaf litter, and they are members of the fauna of the canopy as well. The genus *Rotundabaloghia* was erected by Hirschmann (1975a), and now contains more than 100 species worldwide (Kentschán, 2007a).

From the East and Southeast Asian regions, *Rotundabaloghia* species were reported from the Philippines, Indonesia, and Japan (Hirschmann, 1975b; Hirschmann and Hiramatsu, 1975; Hiramatsu, 1977), and this is the first record of a species of *Rotundabaloghia* from the island of Taiwan.

### MATERIAL AND METHODS

Specimens were cleared in lactic acid and later

stored in alcohol. Drawings were made with a camera lucida. Microscopic photographs were taken at the Hungarian Natural History Museum, Budapest, with a Nikon Coolpix digital camera applied to a Nicol Eclipse E600 microscope. Abbreviations: h1~h4, hypostomal setae 1~4, St1~St5, sternal setae 1~5. Nomenclature for the ventral idiosomal setae follows Hirschmann (1975a): V2, V6, V7, and V8 are ventral setae, except that I use the name "adanal setae" (*ad*) instead of V4. Measurements are given in micrometers ( $\mu\text{m}$ ).

### Description of the new species

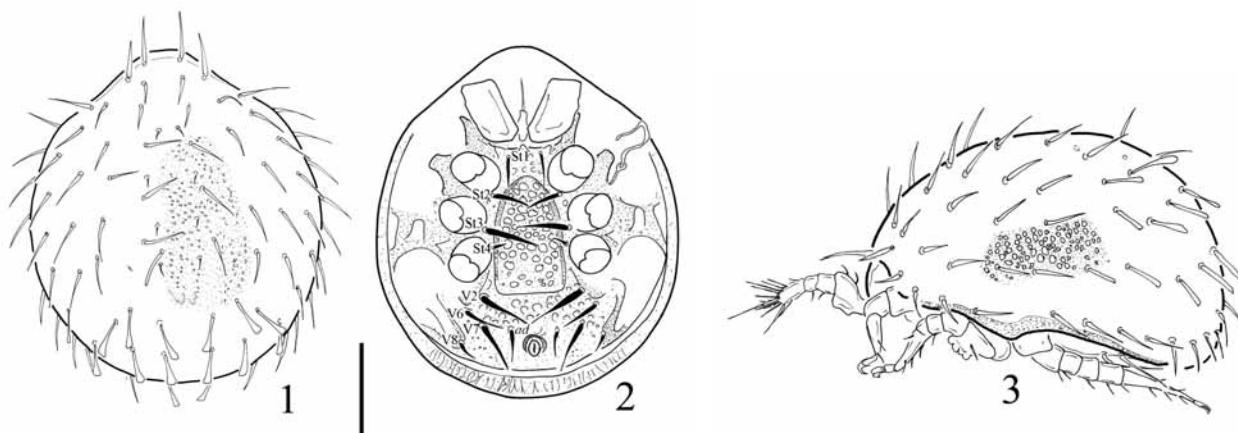
*Rotundabaloghia korsosi* sp. nov.

(Figs. 1~14)

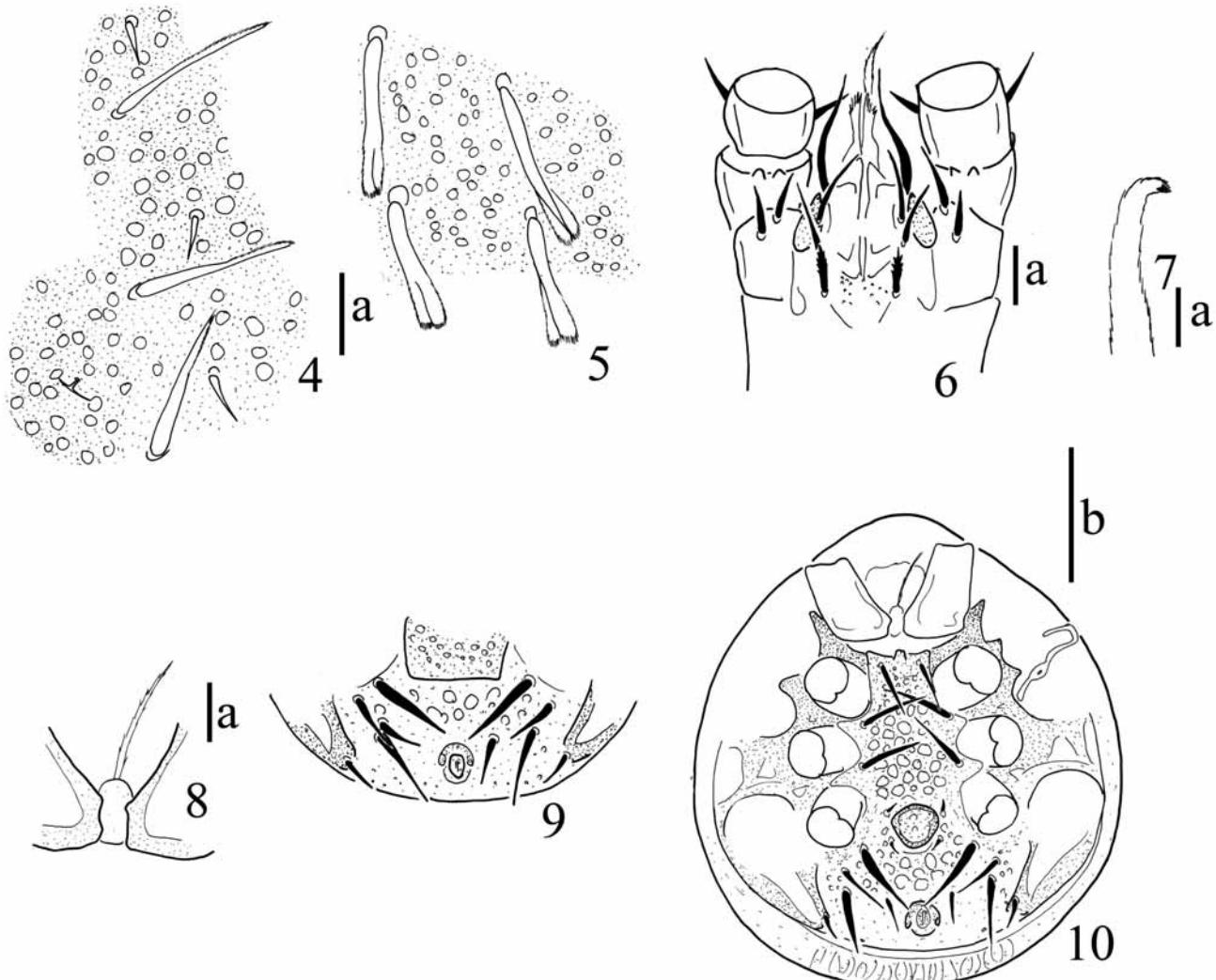
**Diagnosis:** Sternal setae St1, St2, and St3 long and wide, St4 5-times shorter than other sternal setae. All ventral setae smooth, V2 and V7 long and wide, *ad* and V6 a little shorter than V2 and V7. V8 3-times shorter than V2 and V7. Sternal, genital, and ventral shields covered by alveolar ornamentation. Genital shield scutiform. Dorsal setae heterotrichous, most setae long, needle-like, and bearing short hairs on its apical part, 4 pairs of short, smooth, needle-like setae visible on central region, and several spatuliform setae on caudal region of dorsal shield.

**Material examined:** Holotype: ♀. TAIWAN, Nantou County, Lienhuachih, around the forestry station, from leaf litter, N23°55.1'; E120°52.7', 715 m, May 17, 2008, leg. L. Dányi, Z. Korsós,

\*Corresponding author: E-mail: kentscha@zool.nhmus.hu



Figs. 1~3. *Rotundabaloghi korsosi* sp. nov. (holotype, female). 1. Dorsal view. 2. Ventral view. 3. Lateral view (scale bar: 100  $\mu$ m).



Figs. 4~10. *Rotundabaloghi korsosi* sp. nov. 4. Setiform dorsal setae. 5. Spatuliform dorsal setae. 6. Ventral view of gnathosoma. 7. Epistome. 8. Tritosternum (holotype, female). 9. Abberation of the ventral chaetotaxy in a female (paratype). 10. Ventral view of male (paratype) (scale bar: a: 20  $\mu$ m; b: 100  $\mu$ m).

and E. Lazányi. Holotype deposited in the National Museum of Natural Sciences, Taichung, Taiwan.

Paratypes deposited in the National Museum of Natural Sciences, Taichung, Taiwan: 5 ♀♀: locality and date same as for holotype; 2 ♀♀: TAIWAN, Nantou County, Shueili, Renluen, experimental forest area, primary forest, from decayed wood, N23°42.5'; E120°55.3', 1615 m, May 15, 2008, leg. L. Dányi, Z. Korsós, and E. Lazányi; 1 ♂, 1 ♀: TAIWAN, Taitung County, Southern Cross Island Highway, Wulu, secondary mixed forest, from leaf litter, N23°08.5'; E121°2.7', 1631 m, May 28, 2008, leg. L. Dányi, Z. Korsós, and E. Lazányi; 8 ♀♀, 1 ♂: TAIWAN, Nantou County, Shueili, Renluen, experimental forest area, primary forest, from leaf litter, N23°42.3'; E120°56.2', 1901 m, May 16, 2008, leg. L. Dányi, Z. Korsós, and E. Lazányi.

Paratypes deposited in the Soil Zoology Collections of the Hungarian Natural History Museum, Budapest, Hungary: 2 ♀♀, 1 ♂, TAIWAN, Taitung County, Yanping, secondary pine forest (*Cryptomeria taiwanensis*), from leaf litter, N22°53.5'; E121°01.9', 1092 m, May 28, 2008, leg. L. Dányi, Z. Korsós, and E. Lazányi.

**Description:** Female. Length of idiosoma 310~360  $\mu$ m, width 280~310  $\mu$ m (n = 19). Shape circular, posterior margin rounded.

**Dorsal side** (Figs. 1, 2). Marginal and dorsal shields fused. Most dorsal setae long and pilose, 4 pairs in central region short (5-times shorter than other dorsal setae), smooth and needle-like (Figs. 4, 11). One pair of lyrifissures visible in central region. Caudal setae spatuliform with short hairs on margins (Figs. 5, 12). Pattern of dorsal shield alveolate.

**Ventral side** (Fig. 2). Sternal and ventral shields with alveolar ornamentation. Three pairs of sternal setae (St1, St2, and St3) long and smooth, St4 5-times shorter than other sternal setae. Distance between St1 and St2 as long as between St2 and St3. St4 placed near basis of St3. Ventral setae as follows: V2 long, as long as V7, V2 and V7 smooth and setiform, V6 and ad a little shorter than V2 and V7, smooth and setiform. V8 2-times shorter than V2 and V6, V8 placed near posterior region of metapodal lines (Fig. 13).

Stigmata situated between coxae II and III. Peritreme hook-shaped.

Genital shield scutiform, bearing an alveolar pattern and lacking a process on its apical margin. Base of tritosternum narrow, lacinia long with

several spines on its margins (Fig. 8).

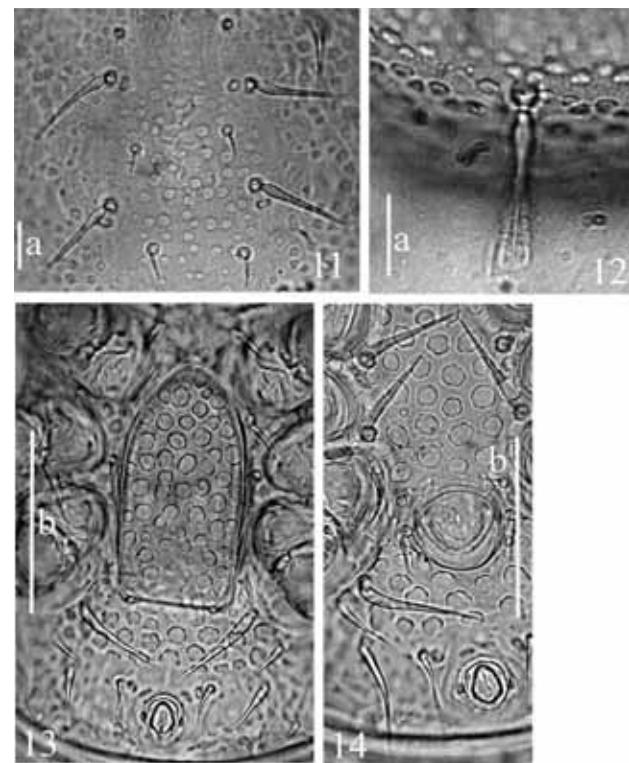
**Gnathosoma** (Fig. 6). Corniculi horn-like, laciniae short and smooth. Hypostomal setae as follows: h1 long, smooth, and setiform; h2 shorter than h1, setiform and smooth; h3 as long as h2, setiform and smooth; h4 short, setiform, with serrated margin. Labrum bifurcated, with hairs on its apical part, and apical part of epistome with short hairs (Fig. 7). Palp trochanter with 2 smooth setae, other setae of the palp smooth and simple.

**Aberration.** One female of the Taiwanese specimens bearing 1 of the ad setae near V6 (Fig. 9).

**Male.** Length of idiosoma 330~350  $\mu$ m, width 280~310  $\mu$ m (n = 3). Shape circle, posterior margin rounded.

**Dorsal side.** Ornamentation and chaetotaxy of dorsal shield as for female.

**Ventral side** (Fig. 10). Three pairs of sternal setae (St1, St2, and St3) long and smooth, St4 5-times shorter than other sternal setae. Distance between St1 and St2 as long as between St2 and St3. St4 placed near anterior margin of genital shield. V1 present, similar to St4, and found near posterior margin of genital shield. Shape and position of ventral setae same as for female (Fig. 14).



Figs. 11~14. Microscopic photographs of *Rotundabaloghia korsosi* sp. nov. 11. Dorsal setiform setae. 12. Dorsal spatuliform setae. 13. Sternal and ventral region of female (paratype). 14. Sternal and ventral region of male (paratype) (scale bar: a: 20  $\mu$ m; b: 100  $\mu$ m).

Genital shield alveolar and placed between coxae IV.

*Gnathosoma*. Same as in female.

Larvae and nymphs are unknown.

*Etymology*. I dedicate the new species to Dr. Zoltán Korsós, senior museologist and millipede specialist, Curator of the Myriapoda Collection of the Hungarian Natural History Museum, Budapest, who organized the 2008 collecting trip to Taiwan which brought back the specimens of the new *Rotundabaloghia* species.

*Habitat*. The specimens of the new species seemingly live in leaf litter and decayed wood. The moss, soil, and canopy samples did not contain specimens of this species.

*Differential diagnosis*. The new species is very similar to *Rotundabaloghia hirschmanni* Hiramatsu, 1977, known from Kyushu Island, Japan. The distinguishing characters are summarized in Table 1.

#### Taxonomic notes

Species of *Rotundabaloghia* mites have short, smooth, needle-like setae between the long dorsal setae. Hirschmann (1992) placed them into two species-groups (*mahunkai* and *baloghi* species-group). This system was based on the type of ventral setae, but the dorsal chaetotaxy was not investigated. I think this character combination (short needle-like setae between the long dorsal setae) is unique to the genus *Rotundabaloghia*, and species which have similar dorsal chaetotaxy belong to a separate group of *Rotundabaloghia* mites ("typical *Rotundabaloghia*" species).

Currently (with the new species) 14 species have this character combination. They are as follows: *R. baloghi* Hirschmann, 1975, *R. baloghioides* Hirschmann, 1975, *R. baloghisimilis* Hirschmann, 1975, *R. kaszabi* Hirschmann, 1975, *R. kaszabisimilis* Hirschmann, 1975, *R. latibaloghia* Hirschmann, 1975, *R. macroseta*

Hirschmann, 1975, *R. monomacroseta* Hirschmann, 1975, *R. mahunkai* Hirschmann, 1975, and *R. pilosa* Hirschmann, 1975 from New Guinea; *R. hirschmanni* Hiramatsu, 1977 from Japan; *R. makilingensis* Hirschmann, 1992 and *R. makilingoides* Hirschmann, 1992 from the Philippines; and *R. korsosi* sp. nov. from Taiwan.

Key to the species of the "typical Rotundabaloghia" species

1. V8 setae smooth..... 2
- V8 setae not smooth..... 4
2. V8 shorter than other ventral setae..... 3
- V8 as long as V2, V6, and *ad*..... *R. kaszabi*
3. V8 as long as *ad*..... *R. korsosi*
- V8 shorter than *ad*..... *R. hirschmanni*
4. *ad* bearing short hairs on its margin..... 5
- *ad* not bearing short hairs on its margin..... 8
5. *ad* and V8 shorter than V7..... 6
- *ad* as long as V7 and V8..... *R. baloghioides*
6. St1 reaching basis of St2..... *R. baloghi*
- St1 not reaching basis of St2..... 7
7. *ad*, V7, and V8 wide..... *R. latibaloghia*
- *ad*, V7, and V8 narrow..... *R. baloghisimilis*
8. V7 bearing short hairs on its margin..... 9
- V7 smooth..... 10
9. St1, St2, and St3 much longer (10×) than St4..... *R. macroseta*
- St1, St2, and St3 only 4× longer than St4 ..... *R. mahunkai*
10. St1 longer and wider than St2 and St3 ..... *R. monomacroseta*
- St1 not longer or wider than St2 and St3..... 11
11. V7 2-times longer than as *ad*..... *R. kaszabisimilis*
- V7 as long as *ad*..... *R. pilosa*

#### Zoogeographical notes

Presumably the origin of the *Rotundabaloghia* mites was in Gondwanaland, because species of

Table 1. Differences between *Rotundabaloghia korsosi* sp. nov. and *R. hirschmanni* Hiramatsu, 1977

	<i>R. korsosi</i> sp. nov.	<i>R. hirschmanni</i>
Dorsal setae on caudal region	Spatuliform with short hairs	Setiform with short hairs
Length of setae <i>ad</i>	As long as V8	Longer than V8
End of V7	Reaching posterior margin of ventral shield	Not reaching posterior margin of ventral shield
Male V1	Short	Long

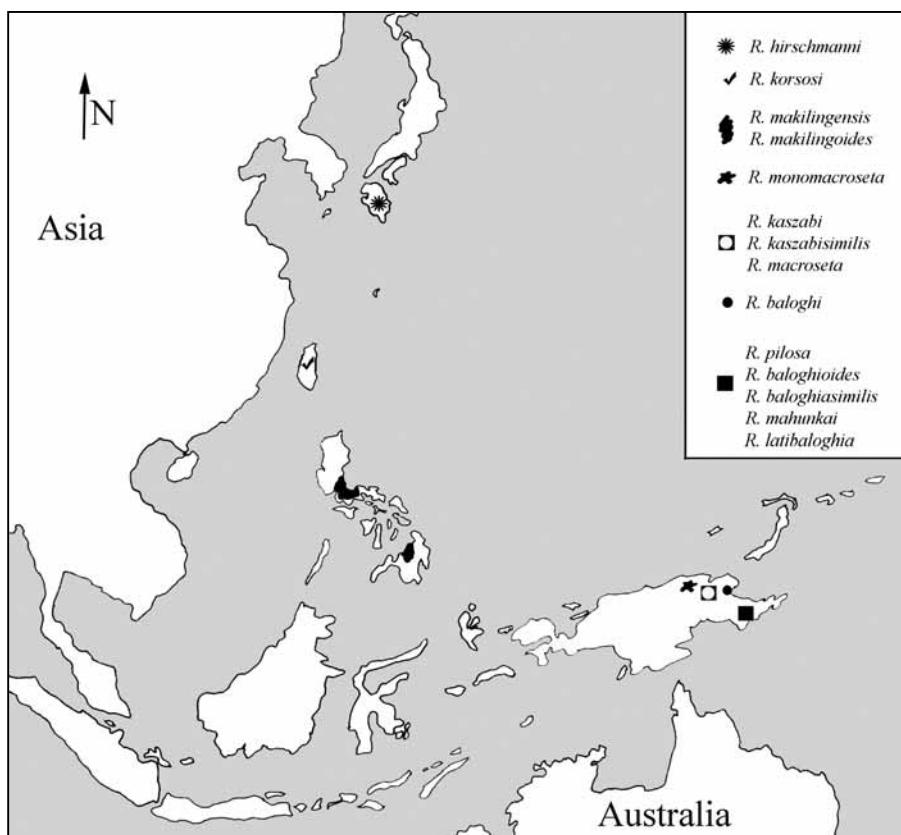


Fig. 15. Distribution of "typical *Rotundabaloghia*" species.

the genus occur throughout the tropics (Wiśniewski, 1993; Kontschán, 2004, 2005, 2006, 2007a, b). Several different morphological types of these mites were described (Hirschmann, 1992), but two types, the "angulogynella" (with a triangular genital shield of the female) and the "typical *Rotundabaloghia*" (heterotrich dorsal setation) are only known from regions of East and Southeast Asia, thus it may be hypothesized that they are endemic to this region.

The occurrence of the genus *Rotundabaloghia* in Taiwan could be foreseen, because species of the genus had already been found in the Philippines and Japan. The new *Rotundabaloghia* species strengthens the connection of Taiwan to the fauna of the Philippine Archipelago and New Guinea (Fig. 14), but also to the Palaearctic Region (Japan), which is supported by other terrestrial arthropod groups, e.g., millipedes (Korsós, 2004).

#### ACKNOWLEDGEMENTS

I thank Dr. Zoltán Korsós and Mr. László Dányi for their comments on an earlier draft of the

manuscript. The paper was supported by the Janos Bolyai Research Scholarship of the Hungarian Academy of Sciences. The collecting trip to Taiwan in 2008 was organized within the framework of the Hungarian OTKA project no. 69235, and was supported by the National Science Council, Taipei, and the Hungarian Academy of Sciences, Budapest.

#### REFERENCES

- Hiramatsu, N. 1977. Gangsystematik der Parasitiformes. Teil 239. Teilgang einer neuen Rotundabaloghia-Art aus Japan (Dinychini, Uropodinae). Acarol. Schriftenreihe Vergleichende Milbenkunde 23: 19-20.
- Hirschmann, W. 1975a. Gangsystematik der Parasitiformes. Teil 201. Die Gattung *Rotundabaloghia* nov. gen. Hirschmann 1975 (Dinychini, Uropodinae). Acarol. Schriftenreihe Vergleichende Milbenkunde 21: 23-26.
- Hirschmann, W. 1975b. Gangsystematik der Parasitiformes. Teil 203. Teilgänge, Stadien von 16 neuen *Rotundabalogia*-Arten (Dinychini, Uropodinae). Acarol. Schriftenreihe

- Vergleichende Milbenkunde 21: 28-34.
- Hirschmann, W. 1992. Gangsystematik der Parasitiformes. Teil 537. Adultengruppen, Verzeichnisse der 129 *Rotundabalogia*-Arten (Dinychini, Uropodinae). Acarol. Schriftenreihe Vergleichende Milbenkunde 39: 96-99.
- Hirschmann, W. and Hiramatsu, N., 1992. 34 Rotundabaloghia-Arten aus Asien (Japan, Neuguinea, Philippinen, Borneo) (Dinychini, Uropodinae). Acarol. Schriftenreihe Vergleichende Milbenkunde 39: 9-25.
- Kontschán, J. 2004. Uropodina mites of East Africa (Acari: Mesostigmata) II. New Rotundabaloghia Hirschmann, 1975 species from Kenya. Folia Entomol. Hung. 65: 5-11.
- Kontschán, J. 2005. New *Rotundabaloghia* Hirschmann, 1975 species (Acari: Mesostigmata: Uropodina) from the Dominican Republic. Ann. hist.-nat. Mus. natl. Hung. 97: 241-249.
- Kontschán, J. 2006. Uropodina (Acari: Mesostigmata) species from Angola. Acta Zool. Acad. Sci. Hung. 52(1): 1-20.
- Kontschán, J. 2007a. Uropodina mites (Acari: Mesostigmata) from Venezuela, with descriptions of four new species. Acta Zool. Acad. Sci. Hung. 53(4): 335-246.
- Kontschán, J. 2007b. A new *Rotundabaloghia* Hirschmann, 1975 species from Cuba (Acari: Mesostigmata: Uropodina). Acta Zool. Mex. (n.s) 23: 135-137.
- Korsós, Z. 2004. Checklist and bibliography of millipedes (Diplopoda) of Taiwan. Coll. Res. 17: 11-32.
- Wiśniewski, J. 1993. Die Uropodiden der Erde nach zoogeographischen Regionen und Subregionen geordnet (Mit Angabe der Lande). Acarol. Schriftenreihe Vergleichende Milbenkunde 40: 221-291.